

**ABSTRACT**  
**AN OPTICAL WAVEGUIDE STRUCTURE**

An optical waveguide structure according to the invention comprises a core layer having a first refractive index  $n_{\text{core}}$ , an array of sub-regions within the core having a second refractive index  $n_{\text{rods}}$ , the array of sub-regions giving rise to a photonic band structure within the core layer, and a cladding layer adjacent to the core layer having a refractive index  $n_{\text{cladding}}$ , wherein:

$$n_{\text{core}} > n_{\text{rods}} \geq n_{\text{cladding}} \text{ and } n_{\text{core}} - n_{\text{rods}} > 0.1.$$

The structure of the present invention is less lossy than prior waveguide structures having photonic bandstructure regions. The out of plane divergence of light in the sub-regions is reduced as compared with air holes which are typically used in photonic crystal structures. As a result more light is coupled back into the core at the sub-region/core interface. Coupling of light into the buffer layer is also reduced. Furthermore, there are added advantages over the prior art associated with the fabrication of these structures.

(Figure 2)